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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,196	10/01/2007	Kazunari Shinbo	1828.023	5896
23598	7590	11/16/2009	EXAMINER	
BOYLE FREDRICKSON S.C. 840 North Plankinton Avenue MILWAUKEE, WI 53203				LAPAGE, MICHAEL P
ART UNIT		PAPER NUMBER		
2886				
NOTIFICATION DATE			DELIVERY MODE	
11/16/2009			ELECTRONIC	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@boylefred.com

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/591,196	SHINBO ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	MICHAEL LAPAGE	2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 21 July 2009.

2a) This action is **FINAL**.                            2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 15-32 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 15,16,18-24 and 26-32 is/are rejected.

7) Claim(s) 17 and 25 is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 21 July 2009.

4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_ .

5) Notice of Informal Patent Application

6) Other: \_\_\_\_\_.

## DETAILED ACTION

1. Claims 15-32 are presented for examination.
2. Claims 31-32 were added as new in amendment filed 07/21/2009.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. **Claims 15, 17-23, 25-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang (U.S. PGPub No. 2008/0163688 A1).**

As to claims 15 and 23, Wang discloses and shows in figure 7 a substance adsorption detection method using a sensor having a crystal oscillator comprising: providing a sensor having an optical waveguide (28") path disposed on the crystal oscillator (1"), said crystal oscillator comprising a crystal and electrodes (2 and 3) formed on either side of said crystal ([094]; [0107]; [0111]; [0113]; where as disclosed

the embodiment of figure 7 is functionally equivalent to that of figure 3 with the addition of waveguide 28""); and

providing light inputting means (i.e. the bottom surface of waveguide element 28") and light emitting means positioned on one face of said sensor on which a detection target substance is adsorbed ([0113]; [0117], further the examiner would like to point out that there is an apparent type in [0113] and waveguide 26" should be labeled waveguide 28", as 26" does not exist in any figures of Wang);

exposing said sensor to said detection target substance (8"), while inputting light through said light inputting means to the optical waveguide path ([0113]; [0117]; where both ATR and a waveguides function is inherently based upon total internal reflection); and

measuring an oscillation characteristic (i.e. by detector 13 of Figure 3) of said crystal oscillator and of light transmitted on said optical waveguide path and emitted through said light emitting means ([0094], lines 6-7; [0113]; [0117]).

As to claims 18 and 26, Wang disclose and shows in figure 3 where a substance adsorption detection method, wherein a crystal substrate (1) of said crystal oscillator serves as a core of said optical waveguide path ([0088]; [0091]; i.e. as explicitly shown in figure 3 light is guided through crystal oscillator 1).

As to claims 19 and 27, Wang discloses and shows in figure 7 where a substance adsorption detection method, wherein a metallic film is formed on said optical waveguide path ([0121]).

As to claim 20, Wang discloses a substance adsorption detection method comprising:

measuring a propagation characteristic of a surface acoustic wave in a surface acoustic wave element (1''), and of light guided through an optical waveguide path (28'') provided in or on said surface acoustic wave element.

As to claims 22, Wang discloses and shows in figure 7 a substance adsorption detection method according, wherein a sensitive material layer (i.e. electrode 2) whose optical characteristic is changed by substance adsorption is provided ([0142], lines 18-22; [0156], [0158]; where inherently a SPR measurement is a measurement of the evanescent wave as disclosed which is an optical characteristic change caused by the absorption of the binding reactions.

As to claim 28, Wang discloses a sensor which measures a propagation characteristic of a surface acoustic wave in a surface acoustic wave element, and light guided through an optical waveguide path (28'') provided in or on said surface acoustic wave element path ([0058]; [0094], lines 6-7; [0113]; [0117]); where as disclosed the quartz crystal can be exchanged with a surface acoustic wave element which as shown explicitly in figure 3 would guide light).

As to claims 31 and 32, Wang discloses a substance absorption detection method, wherein a thin film (2) is provided on one side of said sensor so that a refractive index of said thin film is changed when said thin film adsorbs said detection target substance to thereby cause light from said light emitting means to change ([0004]; [0087]; [0088]).

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. in view of Ohtsuka et al. (U.S. PGPub No. 2003/0075697 A1).**

As to claims 16 and 24, Wang does not explicitly disclose a substance adsorption detection method, wherein said waveguide path is an optical waveguide layer which has a core (28''), said core being stacked on said crystal oscillator (i.e. as shown explicitly in figure 7) ([0111]).

However, Ohtsuka does disclose in ([0045]), where a waveguide has a cladding layer which as is commonly known in the art are used to surround fiber or waveguide core in order to provide total internal reflection throughout a waveguide or fiber. One of ordinary skill in the art would recognize that a waveguide as shown in Wang could have a clad layer as shown in Ohtsuka in order to provide efficient coupling of the light along the waveguide and also to provide protection to the waveguide from possible harmful materials in the sample under test.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wang with a Clad layer in order to provide the advantage efficient coupling of the light along the waveguide and also to provide protection to the waveguide from possible harmful materials in the sample under test.

**Claims 21, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. in view of Jorgenson et al. (U.S. PGPub No. 2006/0192955 A1).**

As to claim 21, Wang discloses and shows in figure 7 a substance adsorption detection method comprising:

measuring an adsorbed mass (i.e. binding reactions) with at least one of said crystal oscillator and said surface acoustic wave element ([0026]; [0095]; [0113]; [0156], where as is commonly known in the art SPR is done by measuring the change in index of refraction from the absorption of sample on the metal layer); and

measuring an optical characteristic of said metallic colloid layer ([0129], [0130]; where inherently SPR is a measurement of surface plasmon waves present from absorption of a material on a metal layer as disclosed in Wang).

Wang does disclose and shows in figure 7 a sensor comprising: a crystal oscillator (1") ([0096]; [0109])

Wang does not explicitly disclose where a metallic colloid layer formed on said crystal oscillator or said surface acoustic wave element.

However, Jorgenson does disclose in ([0017]) where thin gold films such as found in (Wang [0090]) can be exchanged with gold nanoparticles colloid layers in order to provide the advantage of increased sensitivity in a SPR sensor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wang by replacing the gold metal film with a

gold colloid layer in order to provide the advantage of increased efficiency by increasing the sensitivity of the SPR sensing device.

As to claim 29, Wang does disclose and shows in figure 7 a sensor comprising: a crystal oscillator (1") ([0096]; [0109])

Wang does not explicitly disclose where a metallic colloid layer formed on said crystal oscillator or said surface acoustic wave element.

However, Jorgenson does disclose in ([0017]) where thin gold films such as found in (Wang [0090]) can be exchanged with gold nanoparticles colloid layers in order to provide the advantage of increased sensitivity in a SPR sensor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wang by replacing the gold metal film with a gold colloid layer in order to provide the advantage of increased efficiency by increasing the sensitivity of the SPR sensing device.

As to claim 30, Wang discloses and shows in figure 7 a substance adsorption detection method according, wherein a sensitive material layer (i.e. electrode 2) whose optical characteristic is changed by substance adsorption is provided ([0142], lines 18-22; [0156], [0158]; where inherently a SPR measurement is a measurement of the evanescent wave as disclosed which is an optical characteristic change caused by the absorption of the binding reactions.

***Allowable Subject Matter***

7. Claims 17 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is an examiner's statement of reasons for allowance:

As to claims 17 and 25, the prior arts of record taken alone or in combination with any other references fail to teach or suggest the claimed apparatus or method wherein one of said **electrodes** is an optical waveguide electrode made of **an electrically conductive transparent material having a higher refractive index than a refractive index of said crystal**, said optical waveguide electrode serving as a **core** of said **optical waveguide path**.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Response to Arguments***

9. Applicant's arguments with respect to claims 16, 21, 24 and 29 have been considered but are moot in view of the new ground(s) of rejection.

10. Applicant's arguments filed 07/21/2009 have been fully considered but they are not persuasive.

11. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically

pointing out how the language of the claims patentably distinguishes them from the references. For example on page 8, it appears that applicant is arguing difference between Wang the applicants invention however none of these arguments appear to be with respect to the instant claims, and therefore are not pointing out how the claim language is patentably distinct over the prior art of record.

12. As to the argument with respect to the amended limitation “the light inputting means and the light emitting means are provided on the one face of the sensor” the examiner as cited above believes the primary reference of record discloses above said limitation, further the examiner believes that the primary reference of record provides multiple ways in which it could be interpreted that “the light inputting means and the light emitting means are provided on the one face of the sensor”.

13. As to the arguments with respect to claims 31 and 32 see cited paragraphs above as to an explanation of Surface Plasmon Resonance (SPR) being a known and practiced method which the primary reference of record Wang discloses in ([0004]) "a detection of chemical changes occurring at the surface of the thin metal film. SPR measures changes in the optical thickness (i.e. refractive index) arising from molecular **adsorption** on the meal surface". Therefore the primary reference of record Wang does disclose the claimed limitations of claims 31 and 32.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL LAPAGE whose telephone number is

(571)270-3833. The examiner can normally be reached on Monday Through Friday 7:30AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur Chowdhury can be reached on 571-272-2287. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael LaPage/  
Examiner, Art Unit 2886

/TARIFUR R CHOWDHURY/  
Supervisory Patent Examiner, Art Unit 2886